IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT	:	Antonine Drouot		
SERIAL NO.	:	09/672,182	EXAMINER	: Ryan J. Hesseltine
FILED	:	September 28, 2000	ART UNIT	: 2623
FOR	:	METHOD OF PROCESSING, AND CORRESPONDING FILTERING DEVICE		

APPEAL BRIEF TRANSMITTAL LETTER

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Dear Sir:

Appellants respectfully submit three copies of a Brief For Appellants that includes an Appendix with the pending claims. The Appeal Brief is now due on July 3, 2004.

Appellants enclose a check in the amount of $330.00 covering the requisite Government Fee.

Should the Examiner deem that there are any issues which may be best resolved by telephone communication, kindly telephone Applicants undersigned representative at the number listed below.

Respectfully submitted,
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Date: July 2, 2004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application

Inventor	:	**Antoine Drouot**
Application No.	:	**09/672,182**
Filed	:	**September 28, 2000**
For	:	**METHOD OF PROCESSING, AND CORRESPONDING FILTERING DEVICE**

APPEAL BRIEF

On Appeal from Group Art Unit 2623

Date: July 2, 2004

Russell Gross
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TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, U.S. Philips Corporation, and not the party named in the above caption.

II. RELATED APPEALS AND INTERFERENCES

With regard to identifying by number and filing date all other appeals or interferences known to Appellant which will directly effect or be directly affected by or

have a bearing on the Board's decision in this appeal, Appellant is not aware of any such appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-9 have been presented for examination. All of these claims are pending, stand finally rejected, and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Final Office Action, dated February 3, 2004.

V. SUMMARY OF THE INVENTION

A sequence of pictures encoded and then decoded is often subject to distortion or "noise" that arises during these processes and that results in image artifacts visible to a viewer of the decoded images (page 1, lines 18-24). The encoding/decoding is performed to save transmission bandwidth, or to reduce the amount of space needed to store the images. One type of image artifact arising due to the encoding/decoding is ringing noise, which often appears in the image as a faint second edge tracking in parallel and slightly spaced apart from a true edge in the image (page 1, lines 18-24).

It is known to eliminate the encoding/decoding artifacts utilizing low-pass filtering that is performed based on image compression parameters derived earlier in the encoding/decoding process (page 1, lines 25-29). This low-pass filtering, however, introduces blurring effects into the images. Moreover, the parameters needed might not always be available (page 2, lines 2-5).

Advantageously, the present invention employs an inventive filtering technique in lieu of conventional low-pass filtering, that technique reducing the encoding/decoding artifacts, and, at the same time, avoiding the annoying blurring effects and the need for the earlier-determined parameters (page 2, lines 23-29).

Operationally, pixels in a picture are divided into two groups. The first group includes those pixels determined to be part of an edge, e.g., of some object in the image. The second group consists of the non-edge pixels. The latter pixels may be filtered without disturbing true edges in the image (page 2, lines 19-22). A pixel from the second group is then chosen (page 6, lines 4-7). Filtering of the image is performed by replacing the chosen pixel with a pixel selected from a group of pixels (page 6, lines 32-33). That group includes the chosen pixel and at least one of the pixels in immediate vertical, horizontal or diagonal adjacency with the chosen pixel (page 4, lines 11-13; page 3, lines 1-2). As a result, image artifacts arising from the encoding/decoding are eliminated. Yet, no low pass filtering is needed, and the disadvantages of low pass filtering are therefore avoided.

VI. ISSUES

A. Whether claims 1-4 and 7-9 are unpatentable under 35 U.S.C. 103(a) as obvious over UK Patent Application GB 2321816 to Lee et al. ("Lee") in view of U.S. Patent No. 4,642,813 to Wilder; and

B. Whether claims 5 and 6 are unpatentable under 35 U.S.C. 103(a) as obvious over Lee in view of Wilder and U.S. Patent Application 5,852,475 to Gupta et al. ("Gupta").

VII. GROUPING OF CLAIMS

Claims 1-4, 7-9 stand or fall together. Likewise claims 5 and 6 stand or fall together.

VIII. ARGUMENT

Claim 1 recites a method of processing data which represents a sequence of pictures, previously encoded and decoded, comprising the steps of:

". . . replacing the chosen pixel with a pixel that is selected from among said chosen pixel and at least one pixel of said pixels within a picture in immediate vertical, horizontal or diagonal adjacency with said chosen pixel."

As the final Office Action acknowledges, the Lee reference fails to disclose or suggest the above quoted replacing step.

Instead, Lee implements conventional (Lee, page 1, lines 11-13; page 2, lines 1-3) low-pass filtering (page 2, lines 15-22) as essential to its methodology:

> With a view to solve or reduce the above problems, it is an aim of embodiments of the present invention to provide a loop filter and a loop filtering method for reducing blocking effect and ringing noise in a high compression encoding system, in which simple low pass filtering is performed for simultaneously reducing the blocking effect and the ringing noise occurring when block-based coding is performed. (Lee, page 2, lines 15-22.)

Lee low-pass filters a non-edge pixel based on the nature of pixels within a window centered on the pixel (page 10, line 26 – page 11, line 15). The nature of those pixels is determined by a binary edge map information generator 210 (FIG. 2) In

particular, if the pixels within the window are determined to be homogeneous, the center pixel is low-pass filtered by a filter with a first set of weights, e.g., an average filter (FIG. 4B; FIG. 2, ref. no. 254). If, on the other hand, the pixels are not homogeneous, the center pixel is low-pass filtered by a filter with a second set of weights, e.g., a weighted filter (FIG. 4C; FIG. 2, ref. no. 256).

The Wilder reference relates to quality control. The Wilder device automatically and electro-optically inspects graphic indicia on a product, such as a computer keyboard, to determine whether the product is the same as a previously inspected prototype (col. 1, lines 6-11). Image data collected by scanning the article is filtered (FIG. 4A, ref. no. 14) in preparation for subsequent edge detection (col. 17, lines 10: "edge detection"; FIG. 4A, ref. no. 22) and pattern recognition (col. 12, lines 29-50).

The Wilder filter 14 includes a median filter 33 (FIG. 5) that collects five consecutive pixels aligned in one spatial dimension and replaces the third pixel with the median of the five pixels (col. 16, lines 62-65; col. 3, lines 18-22). In the two-dimensional embodiment, the Wilder median filter collects 25 pixels arranged in a 5 x 5 square of pixels and replaces the center pixel with the median of the 25 pixels (col. 17, lines 11-12).

The Wilder filter 14 also includes a 3-pixel average filter 39 that receives the output of the median filter 39.

Wilder touts the median filter 33 as effective at eliminating spike noise and "very effective against speckle noise which is characteristic of the surface of the keys under inspection" (col. 17, lines 3-5).

Item 8 of the final Office Action states:

> It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the chosen pixel to be filtered with a pixel selected from among said chosen pixel and at least one of said pixels within a picture in immediate horizontal adjacency as taught by Wilder in order to eliminate spike or speckle noise of one or two pixel dimensions and reduce noise without degrading the response to a graphic pattern (column 16, line 62-column 17, line 5).

The Office Action does not specify how it is being proposed to modify Lee in view of Wilder. Nor does it appear that any such modification would meet the limitations of claim 1.

Firstly, as to the latter point, the Wilder median filter, whether realized in one or two spatial dimensions, selects from among a center pixel, two immediately-adjacent pixels and two further pixels that are not immediately adjacent to the center pixel. There exists merely the possibility that the selected pixel might happen to be either the center pixel or an immediately adjacent pixel.

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) MPEP 2112.

Since the selected pixel in Wilder might be neither the center pixel nor any pixel in immediate adjacency, Wilder, fails, at least for this reason, to disclose, suggest or feature "replacing the chosen pixel with a pixel that is selected from among said chosen

pixel and at least one pixel of said pixels within a picture in immediate vertical, horizontal or diagonal adjacency with said chosen pixel" which language explicitly appears in claim 1 of the present invention. For at least this reason, Wilder fails to compensate for the shortcomings of Lee, and the proposed Lee/Wilder combination fails to render obvious the invention as recited in claim 1 of the present invention.

Secondly, although the Office Action fails to specify how Lee is being modified in view of Wilder, it is at least conceivable that the Office Action intends to precede one or both of the Lee average filter 254 and the Lee weighted filter 256 with the Wilder median filter 33, based on the configuration shown in reference number 14 of FIG. 5 in Wilder.

Such a modification would undermine Lee. The Lee filter determiner 252 (FIG. 2) decides whether the output of the binary edge map information generating portion 210 represents a homogeneous area or an edge area. If a homogeneous area is represented, the filter determiner 252 directs inputted image data from the image storing unit 200 toward the average filter 254. Otherwise, if an edge area is represented, the filter determiner 252 directs the inputted image data toward the weighted filter 256 (page 11, lines 4-12).

The 10x10 grid in FIG. 3 depicts an example of the output of portion 210. The exploded 3x3 pixel areas show average filtering for one region of the output and weighted filtering for another region of the output. The respective decisions as to the type of filtering were made based on the nature of the respective regions of the output. To median filter after these decisions are made would change the nature of the image data to be filtered and would therefore interfere with proper decision-making.

If median filtering is being incorporated into Lee, the median filtering should be performed before image data is processed by, and subject to the decision made by, the binary edge map information generating portion 210.

Regarding performance of the pixel-choosing step of claim 1 of the present invention, Lee, at best, appears to do this in step 545 of FIG. 5, which is performed by the Lee filter determiner 252 (page 14, lines 12-21). The pixel-choosing step necessarily precedes the replacing step. Since purported Lee median filtering can only be construed as corresponding to the replacing step, since the pixel-choosing step precedes the replacing step and since the Lee filter determiner 252 performs the pixel-choosing step, it follows that Lee median filtering must occur after the output from the binary edge map information generating portion 210. As discussed above, the latter interferes with proper decision-making by the portion 210.

On the other hand, placement of the purported Lee median filter after the low-pass filters 254, 256 would appear to be an awkward, ineffective construction, since any speckle- or spike-eliminating benefit would be compromised.

For at least all of the foregoing reasons, no apparent modification of Lee in view of Wilder results in an embodiment meeting the limitations of the present invention as recited in claim 1, nor does it appear than any Lee/Wilder combination would have been obvious. Accordingly, claim 1 is not rendered obvious by the applied references.

Claims 2-4 and 7-9 depend from and include all of the limitations of base claim 1. These claims are likewise deemed to distinguish patentably over the applied references, at least due to their dependency from base claim 1.

Claims 5 and 6 also depend from base claim 1 and stand rejected as obvious over Lee in view of Wilder and Gupta. Gupta relates to low-pass filtering (col. 23, line 57), says nothing suggestive of median filtering, and cannot compensate for the deficiencies in Lee and Wilder. Accordingly, claims 5 and 6 are likewise patentable over the applied references.

IX. CONCLUSION

In view of the above analysis, it is respectfully submitted that the referenced teachings, whether taken individually or in combination, fail to anticipate or render obvious the subject matter of any of the present claims. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,

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Date: July 2, 2004

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X. APPENDIX: THE CLAIMS ON APPEAL

1. Method of processing data which represents a sequence of pictures, previously encoded and decoded, comprising the steps of:

examining pixels within a picture of said sequence to detect edge pixels and non-edge pixels;

choosing from among the detected non-edge pixels, a pixel to be filtered; and

replacing the chosen pixel with a pixel that is selected from among said chosen pixel and at least one pixel of said pixels within a picture in immediate vertical, horizontal or diagonal adjacency with said chosen pixel.

2. A method of processing data as claimed in claim 1, wherein the selected pixel is the median pixel of a set having an odd number of members from among said detected non-edge pixels, at least one of said odd number of members being said chosen pixel, said odd number of members comprising said at least one pixel in immediate vertical, horizontal or diagonal adjacency.

3. A method of processing data as claimed in claim 1, wherein the method is applied to the luminance component of the pixels of said picture.

4. A method of processing data as claimed in claim 1, wherein a pixel is detected as an edge pixel if a magnitude representative of a gradient of the pixel is greater than a predetermined threshold.

5. A method of processing data as claimed in claim 4, wherein a pixel is detected as an edge pixel if the horizontal component of a gradient of said pixel is greater than the vertical component of said gradient and if the modulus of said gradient is greater

than both the modulus of the gradient of the adjacent pixel on the left and the modulus of the gradient of the adjacent pixel on the right.

6. A method of processing data as claimed in claim 4, wherein a pixel is detected as an edge pixel if the vertical component of a gradient of said pixel is greater than the horizontal component of said gradient and if the modulus of said gradient is greater than both the modulus of the gradient of the adjacent lower pixel and the modulus of the gradient of the adjacent upper pixel.

7. A method of processing data as claimed in claim 1, wherein a pixel is filtered if the number of edge pixels in a defined neighborhood of the pixel lies within a defined range.

8. A filtering device for carrying out a method as claimed in claim 1.

9. A computer-readable storage medium comprising a software module for storing a set of instructions executable under the control of a computer or a processor and provided for performing at least some of the steps of the processing method as claimed in claim 1.